Fabricated Geomembranes for EPS Geofoam Applications

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What is EPS Geofoam?

- Expanded Polystyrene
- Light-weight cellar plastic (commonly called stryofoam)
- Molded in blocks used for construction purposes

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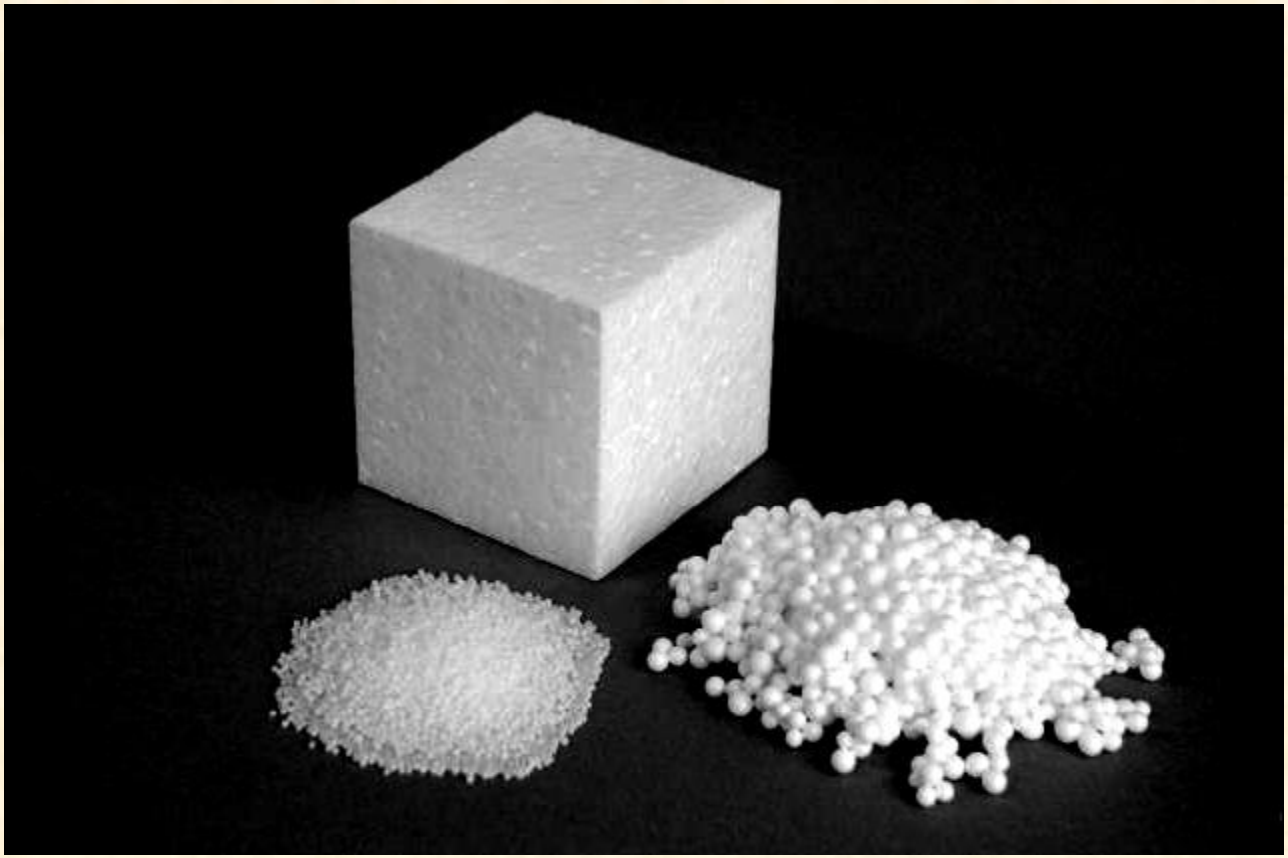
Geofoam Manufacturing



Courtesy of EPSFoamPro.com

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Block Molding of EPS

Courtesy of Tri State Foam

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EPS Properties

ASTM D6817 Physical Property Requirements of EPS Geofoam

Type	EPS12	EPS15	EPS19	EPS22	EPS29	EPS39	EPS46
Density, min., kg/m^3(lb/ft^3)	11.2 (0.70)	14.4 (0.90)	18.4 (1.15)	21.6 (1.35)	28.8 (1.80)	38.4 (2.40)	45.7 (2.85)
Compressive Resistance, min., kPa (psi) at 1 %	15 (2.2)	25 (3.6)	40 (5.8)	50 (7.3)	75 (10.9)	103 (15.0)	128 (18.6)
Compressive Resistance, min., kPa (psi) at 5 %	35 (5.1)	55 (8.0)	90 (13.1)	115 (16.7)	170 (24.7)	241 (35.0)	300 (43.5)
Compressive Resistance, min., kPa (psi) at 10 %[A]	40 (5.8)	70 (10.2)	110 (16.0)	135 (19.6)	200 (29.0)	276 (40.0)	345 (50.0)
Flexural Strength, min., kPa (psi)	69 (10.0)	172 (25.0)	207 (30.0)	240 (35.0)	345 (50.0)	414 (60.0)	517 (75.0)
Oxygen index, min., volume %	24.0	24.0	24.0	24.0	24.0	24.0	24.0

Courtesy EPS Alliance

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EPS Embankment

SR 519 Project – Seattle, Washington

UTA Light Rail – Salt Lake City, Utah

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Common Uses of EPS Geofoam

- Reduce settlement to protect buried utilities and adjacent structures on soft ground
- Improve stability and bearing capacity of embankments,
- Improve stability landslides and cut slopes
- Rapid construction in time critical areas

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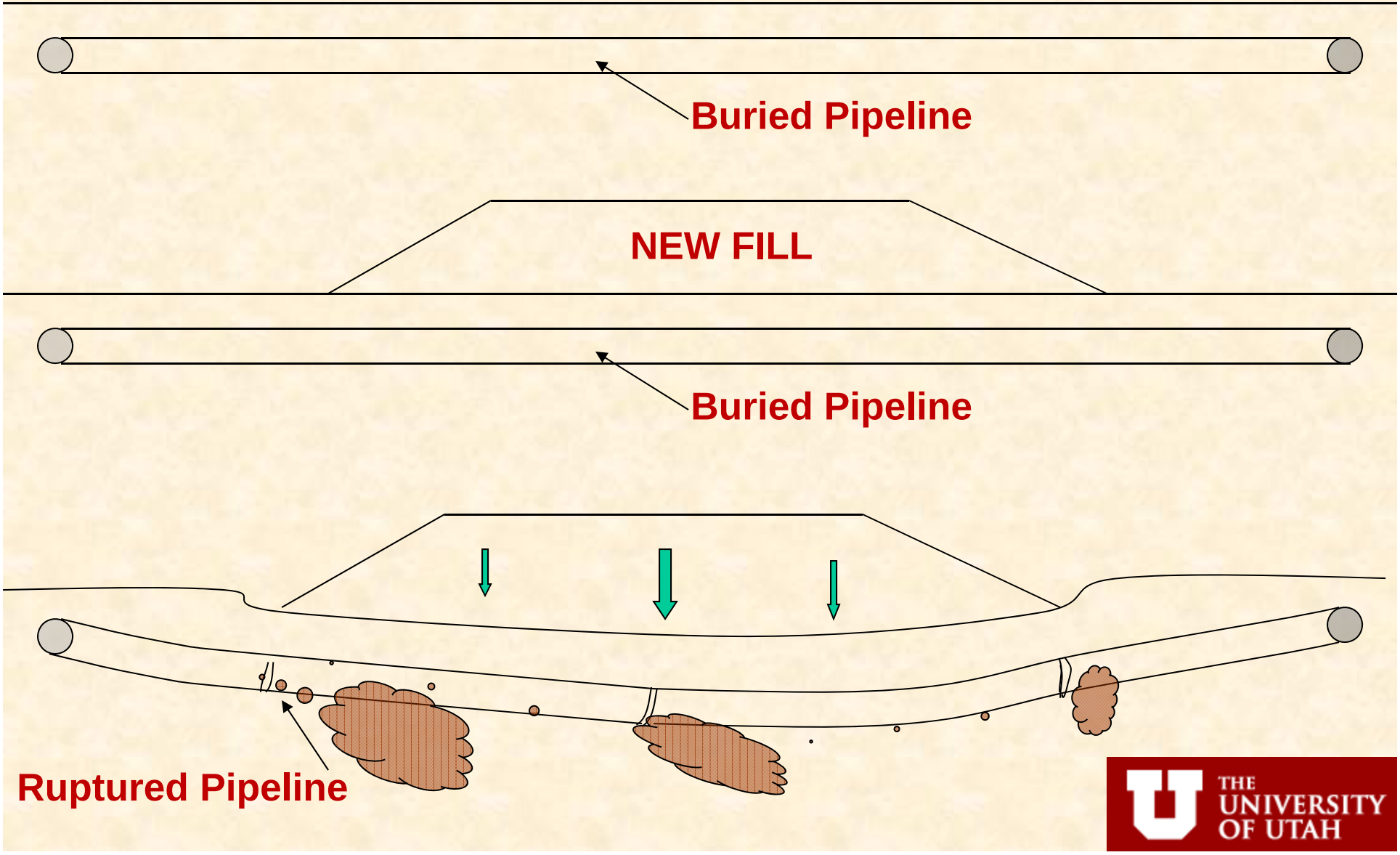
Settlement Reduction and Buried Utilities



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Settlement Reduction and Buried Utilities

Geofoam Embankment from State St. to 200 W.
Interstate I-80, Salt Lake City, Utah

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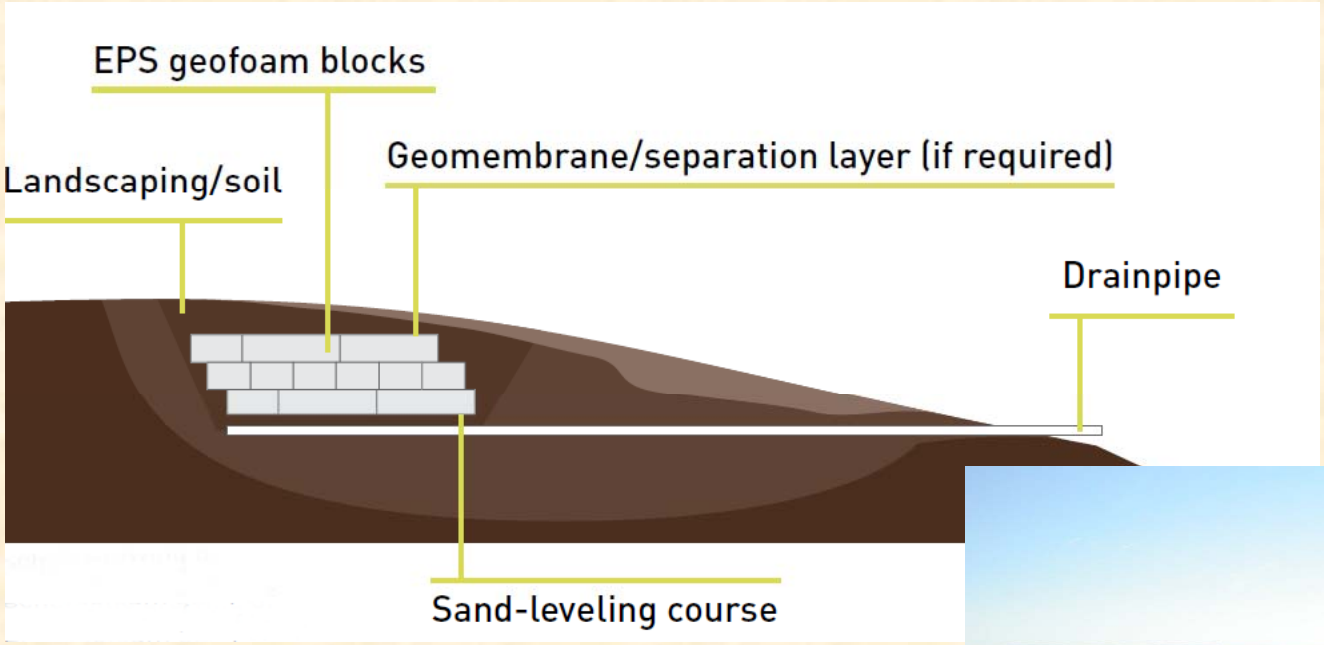
Improving Bearing Capacity and Stability



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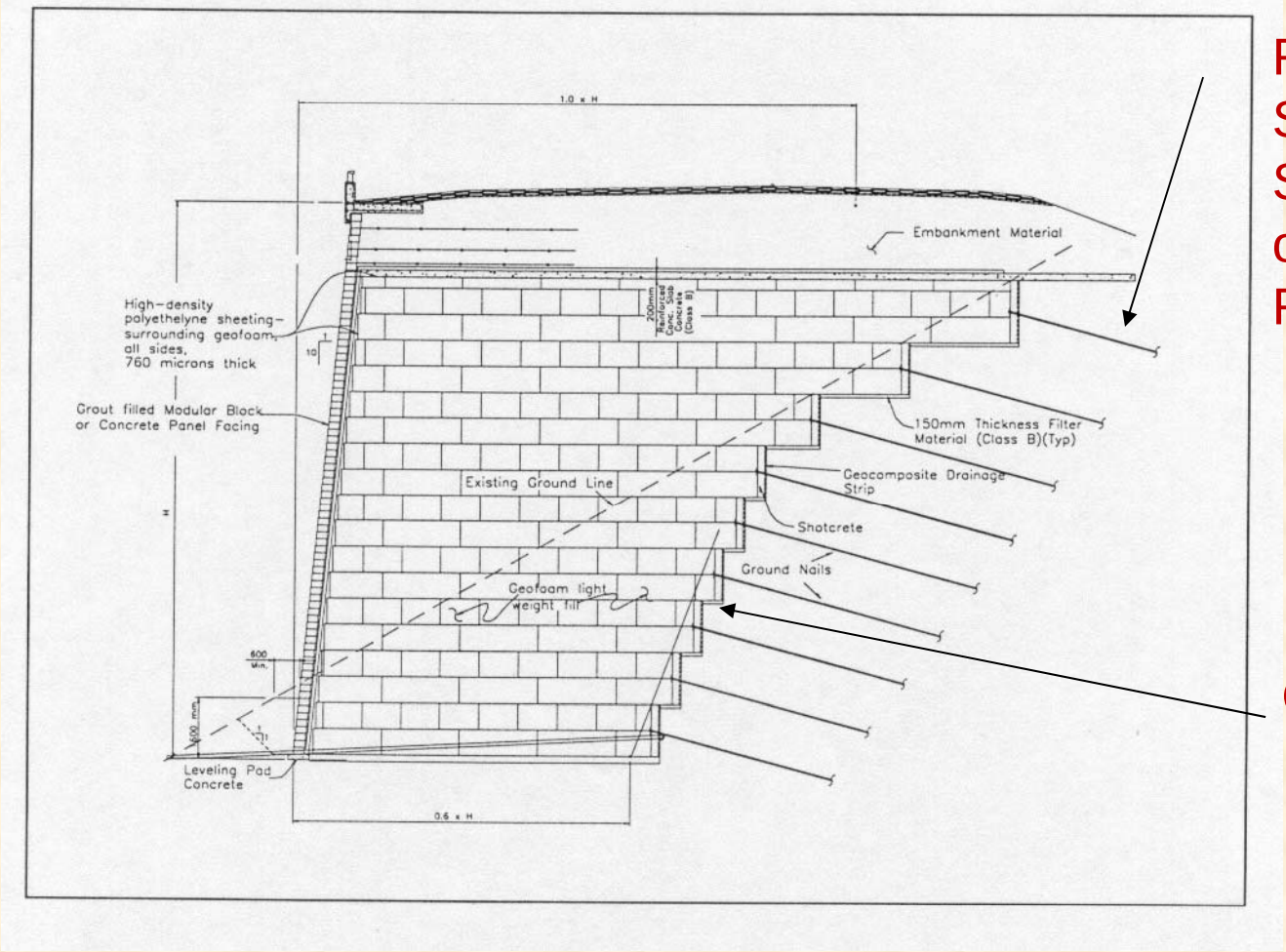
Improve Bearing Capacity and Stability



Reinforced Slope Soil Nails, Soil Anchors, or Other Reinforcement

Cut slope or landslide

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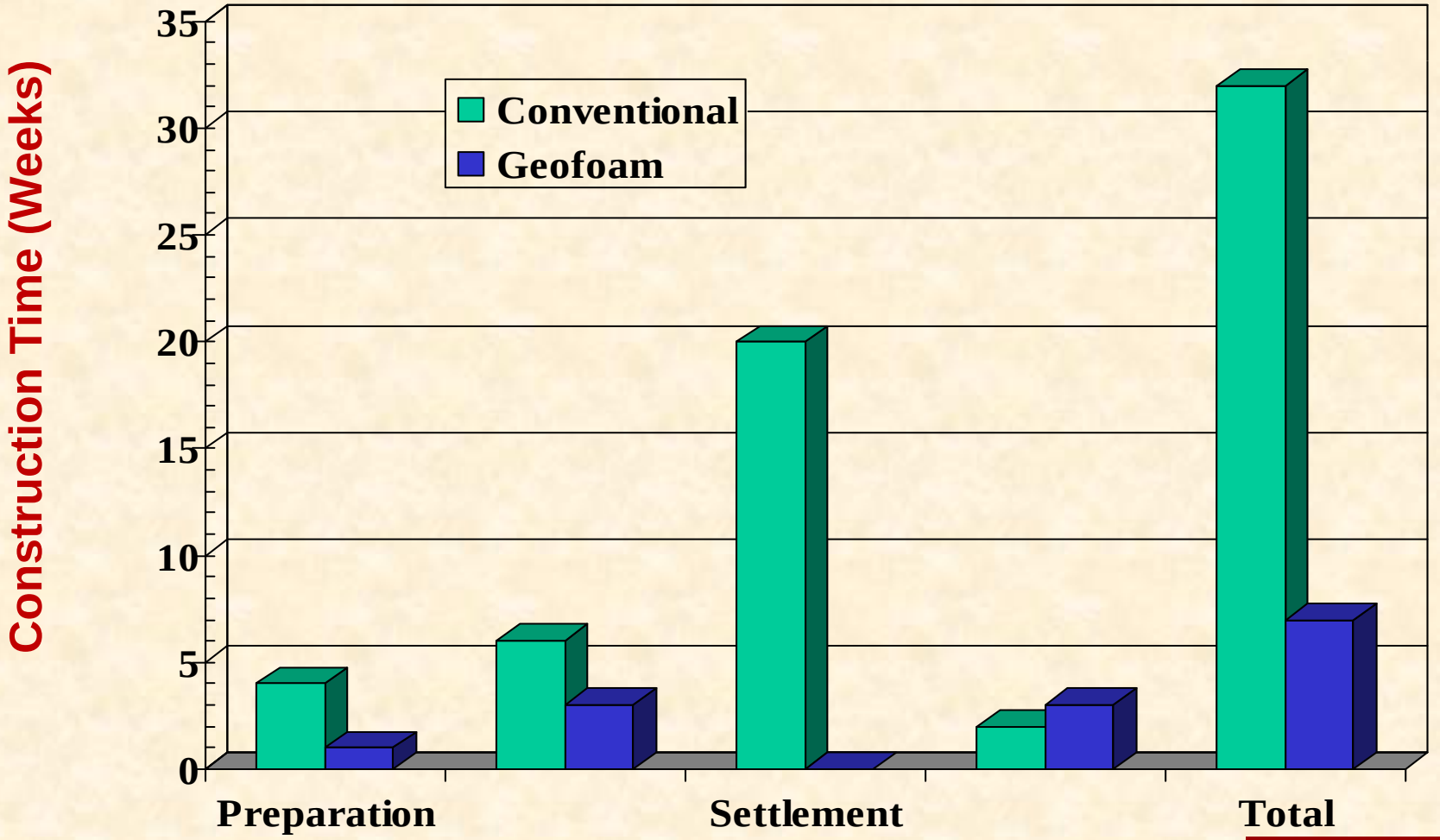
Rapid Construction

(Comparison of Construction Time)



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Design Considerations

- Type
- Dimensions
- Density
- Compressive Strength
- Allowable Load & Creep
- Interface Friction
- Stability of Internal Slope
- Bedding Material & Compaction
- Concentrated Loads
- Moisture Absorption
- Buoyancy
- Thermal Resistance
- Differential Icing
- **Chemical Attack**
- Flammability
- Insect Infestation
- Ultra Violet
- Degradation
- Durability

Design Considerations (Prevention of Chemical Attack)

- Solvents that Dissolve Geofoam
  - Gasoline
  - Diesel
  - Other Petroleum Based Fuels
  - Organic Fluids
- Protection Against Accidental Spills
  - Concrete Load Distribution Slab
  - Geomembrane
  - Fascia Panel Wall with Coping

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Prevention of Chemical Attack

EPS geofoam can be damaged when exposed to certain hydrocarbon chemical and may need protection.

Geomembranes compatible with EPS:

- polypropylene
- polyethylene
- chlorosulphonated polythylene (CSPE)
- ethylene interpolymer alloys (EIAs)

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Prevention of Chemical Attack

Rural Highway in Minnesota, Courtesy of MNDOT

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Prevention of Chemical Attack

Protection of side slope, UTA Frontrunner, Corner Canyon

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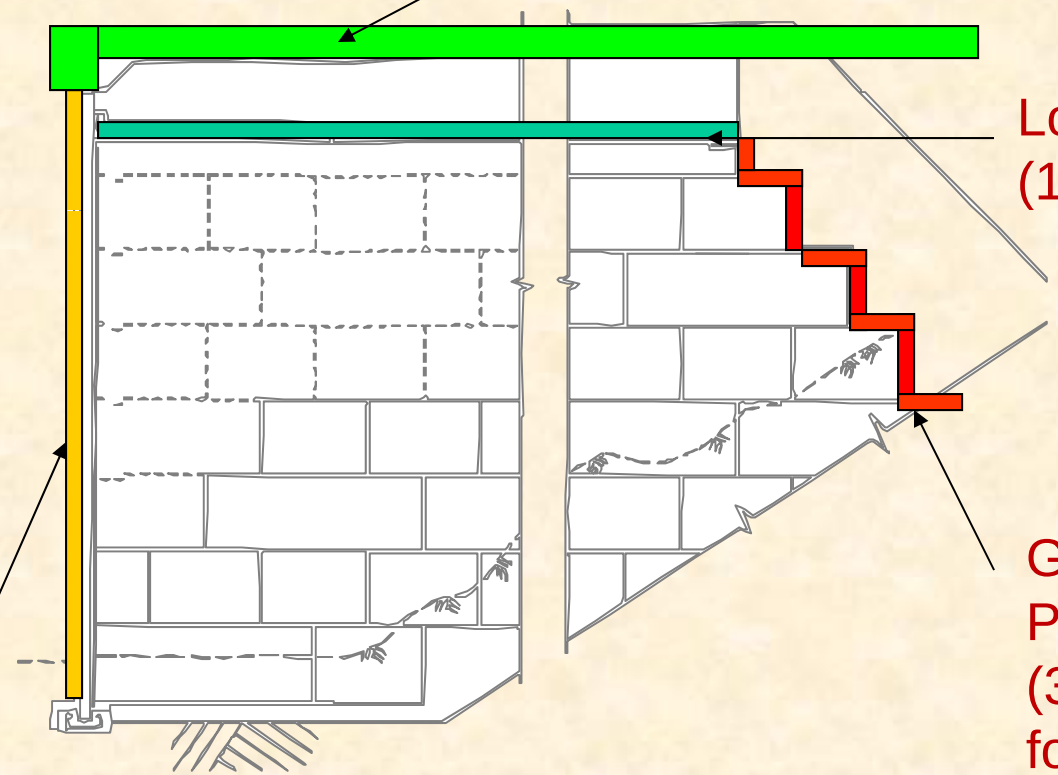
Chemical Attack - Protective Barriers
I-15 Design



Concrete Pavement (35 cm)

Load Distribution Slab
(15 cm - Reinforced)

Geomembrane
Petroleum Resistant
(3 component)
for exposed side slope
only

Tilt-up Panel Wall

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Chemical Attack - Protective Barriers
I-15 Design

- Tripolymer Geomembrane
  - Polyvinyl Chloride
  - Ethylene Interpolymer Alloy
  - Polyurethane
- 9 mm thickness minimum (total)

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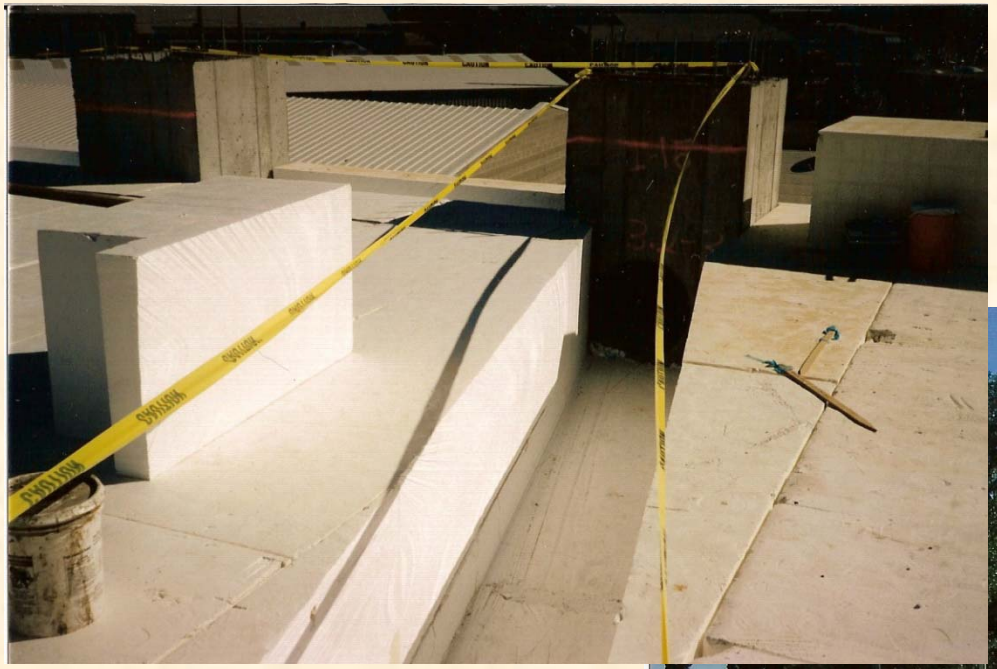
Chemical Attack – Protective Barriers
Storm Drains and Utilities



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Geofoam Handbook

Expanded Polystyrene (EPS)
Geofoam Applications
& Technical Data

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Questions

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